

Applied Mechanics and Graphic Statics MCQ Question Answer

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Question: 1. A smooth cylinder lying on its convex surface remains

- Option A. In stable equilibrium
- Option B. In unstable equilibrium
- Option C. In neutral equilibrium
- Option D. Out of equilibrium

Question: 2. Which one of the following statements is true?

- Option A. The tangent of the angle of friction is equal to coefficient of friction
- Option B. The angle of repose is equal to angle of friction
- Option C. The tangent of the angle of repose is equal to coefficient of friction
- Option D. All the above

Question: 3. A body is said to move with Simple Harmonic Motion if its acceleration, is

- Option A. Always directed away from the centre, the point of reference
- Option B. Proportional to the square of the distance from the point of reference
- Option C. Proportional to the distance from the point of reference and directed towards it
- Option D. Inversely proportion to the distance from the point of reference

Question: 4. The forces which meet at one point and have their lines of action in different planes are called

- Option A. Coplanar non-concurrent forces
- Option B. Non-coplanar concurrent forces
- Option C. Non-coplanar non-current forces
- Option D. Intersecting forces

Question: 5. The Law of Polygon of Forces states that

- Option A. If a polygon representing the forces acting at point in a body is closed, the forces are in equilibrium
- Option B. If forces acting on a point can be represented in magnitude and direction by the sides of a polygon taken in order, then the resultant of the forces will be represented in magnitude and direction by the closing side of the polygon
- Option C. If forces acting on a point can be represented of a polygon taken in order, their sides of a polygon taken in order, their resultant will be represented in magnitude and direction by the closing side of the polygon, taken in opposite order
- Option D. If forces acting on a point can be represented in magnitude and direction by the sides of a polygon in order, the forces are in equilibrium

Question: 6. A spring scale in a stationary lift shows a reading of 60 kg for a man standing on it. If the lift starts descending at an acceleration of $g/5$, the scale reading would be

- Option A. 48 kg
- Option B. 60 kg
- Option C. 72 kg
- Option D. None of these

Question: 7. A heavy ladder resting on floor and against a vertical wall may not be in equilibrium if

- Option A. Floor is smooth and wall is rough
- Option B. Floor is rough and wall is smooth
- Option C. Both floor and wall are rough
- Option D. Both floor and wall are smooth

Question: 8. A 2 m long ladder rests against a wall and makes an angle of 30° with the horizontal floor. Where will be the instantaneous center of rotation when the ladder starts slipping? (i) 1.0 m from the wall (ii) 1.732 m from the wall (iii) 1.0 m above the floor (iv) 1.732 m above the floor The correct answer is

- Option A. (i) and (iii)
- Option B. (i) and (iv)
- Option C. (ii) and (iii)
- Option D. (ii) and (iv)

Question: 9. Effect of a force on a body depends upon its

- Option A. Direction
- Option B. Magnitude
- Option C. Position
- Option D. All the above

Question: 10. A particle moves in a straight line and its position is defined by the equation $x = 6t^2 - t^3$ where t is expressed in seconds and x in meters. The maximum velocity during the motion is

- Option A. 6 m/sec
- Option B. 12 m/sec
- Option C. 24 m/sec
- Option D. 48 m/sec

Question: 11. The tension in a cable supporting a lift

- Option A. Is more when the lift is moving downwards
- Option B. Is less when the lift is moving upwards
- Option C. Remains constant whether it moves downwards or upwards
- Option D. Is less when the lift is moving downwards

Question: 12. If the horizontal range is 2.5 times the greatest height, the angle of projection of the projectile, is

- Option A. 57°

- Option B. 58°
- Option C. 59°
- Option D. 60°

Question: 13. A simple pendulum of length l has an energy E when its amplitude is A . If its amplitude is increased to $2A$, the energy becomes

- Option A. E
- Option B. $E/2$
- Option C. $2E$
- Option D. $4E$

Question: 14. The motion of a particle is described by the relation $x = t^2 - 10t + 30$, where x is in metres and t in seconds. The total distance travelled by the particle from $t = 0$ to $t = 10$ seconds would be

- Option A. Zero
- Option B. 30 m
- Option C. 50 m
- Option D. 60 m

Question: 15. If A is the amplitude of particle executing simple harmonic motion, then the total energy E of the particle is

- Option A. Proportional to A
- Option B. Proportional to A^2
- Option C. Proportional to $1/A^2$
- Option D. Independent of A

Question: 16. If the resultant of two forces P and Q acting at an angle θ makes an angle α with P , then $\tan \alpha$ equals

- Option A. $P \sin \theta / P - Q \cos \theta$
- Option B. $Q \sin \theta / P + Q \cos \theta$
- Option C. $P \sin \theta / P + Q \tan \theta$
- Option D. $Q \sin \theta / P + Q \sin \theta$

Question: 17. On a ladder resting on a smooth ground and leaning against a rough vertical wall, the force of friction acts

- Option A. Towards the wall at its upper end
- Option B. Away from the wall at its upper end
- Option C. Upwards at its upper end
- Option D. Downwards at its upper end

Question: 18. Pick up the correct statement from the following:

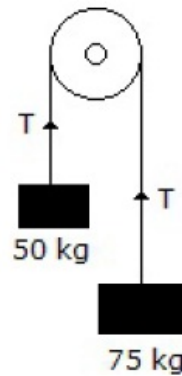
- Option A. If two equal and perfectly elastic smooth spheres impinge directly, they interchange their velocities

- Option B. If a sphere impinges directly on an equal sphere which is at rest, then a fraction $\frac{1}{2}(1 - e^2)$ the original kinetic energy is lost by the impact
- Option C. If two equal spheres which are perfectly elastic impinge at right angles, their direction after impact will still be at right angles
- Option D. All the above

Question: 19. The acceleration of a train starting from rest at any instant is $\frac{1}{6}(V + 1)$ m/sec² where V is the velocity of the train in m/sec. The train will attain a velocity of 36 km/hour after travelling a distance of

- Option A. 2000 m
- Option B. 2100 m
- Option C. 2200 m
- Option D. 2300 m

Question: 20. Two loads of 50 kg and 75 kg are hung at the ends of a rope passing over a smooth



pulley shown in below figure. The tension in the string is:

- Option A. 50 kg
- Option B. 75 kg
- Option C. 25 kg
- Option D. 60 kg

Question: 21. The characteristic of a couple is:

- Option A. Algebraic sum of forces, constituting a couple is zero
- Option B. Algebraic sum of moments of forces, constituting a couple, about any point, is same
- Option C. A couple can be never the balanced by a single force
- Option D. All the above

Question: 22. One Newton is equivalent to

- Option A. 10^5 dyne
- Option B. 10^6 dyne
- Option C. 10^7 dyne
- Option D. 10^8 dyne

Question: 23. If the kinetic energy and potential energy of a simple harmonic oscillator of amplitude A are both equal to half the total energy, then the displacement is equal to

- Option A. A
- Option B. $A/2$
- Option C. $A/\sqrt{2}$
- Option D. $A\sqrt{2}$

Question: 24. The ratio of the ranges on the inclined plane with motion upward and with motion downward for a given velocity, angle of projection will be

- Option A. $\sin(\alpha + \beta)/\sin(\alpha - \beta)$
- Option B. $\sin(\alpha - \beta)/\sin(\alpha + \beta)$
- Option C. $\cos(\alpha - \beta)/\cos(\alpha + \beta)$
- Option D. $\tan(\alpha - \beta)/\tan(\alpha + \beta)$

Question: 25. If α and u are the angle of projection and initial velocity of a projectile respectively, the horizontal range of the projectile, is

- Option A. $u^2 \sin \alpha/g$
- Option B. $u^2 \sin^2 \alpha/g$
- Option C. $u^2 \sin \alpha/2g$
- Option D. $u^2 \sin^2 \alpha/2g$

Question: 26. Williot-Mohr diagram is used to determine deflection in

- Option A. Trusses only
- Option B. Beam only
- Option C. Rigid frames only
- Option D. Any type of structure

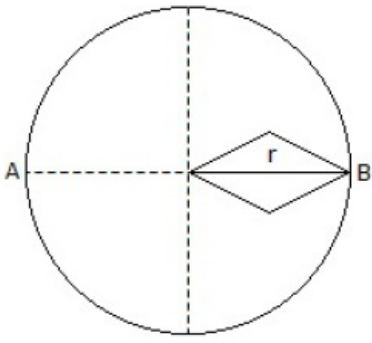
Question: 27. If the velocity of projection is 4 m/sec and the angle of projection is α° , the maximum height of the projectile from a horizontal plane, is

- Option A. $u^2 \cos^2 \alpha/2g$
- Option B. $u^2 \sin^2 \alpha/2g$
- Option C. $u^2 \tan^2 \alpha/2g$
- Option D. $u^2 \sin 2\alpha/2g$

Question: 28. A cube on a smooth horizontal surface

- Option A. Cannot be in stable equilibrium
- Option B. Cannot be in neutral equilibrium
- Option C. Cannot be in unstable equilibrium
- Option D. Can be in any of these states

Question: 29. A square hole is made in a circular lamina, the diagonal of the square is equal to the radius of the circle as shown in below figure the shift in the centre of gravity is



Option A. $r (\pi - 0.75)/(\pi - 0.5)$

Option B. $r (\pi - 0.25)/(\pi - 0.75)$

Option C. $r (\pi - 0.5)/(\pi - 0.75)$

Option D. $r (\pi - 0.5)/(\pi - 0.25)$

Question: 30. The C.G. of a right circular cone lies on its axis of symmetry at a height of

Option A. $h/2$

Option B. $h/3$

Option C. $h/4$

Option D. $h/5$

Answer Sheet

1	B	
2	D	
3	C	
4	B	
5	C	
6	A	
7	D	
8	D	
9	D	
10	B	
11	D	
12	B	
13	D	
14	A	
15	B	
16	B	
17	C	
18	D	
19	D	
20	D	
21	D	
22	A	
23	C	
24	B	
25	A	
26	A	
27	B	
28	D	
29	A	
30	C	